

48. (Amended) The assembly of claim 43 where said light-generating devices are LEDs that generate light in the spectral range 300-900 nm.

49. (Amended) A portable tooth whitening device comprising:
one or more light sources;
at least one optical output
projection means for holding and positioning the optical output outside of a patient's mouth in a manner which provides approximately simultaneous and uniform illumination of a patient's front teeth by the optical output;
connection means for connecting the light source to the optical output; and
a mobile support structure on which the light is attached.

50. (Amended) A portable tooth whitening device as in claim 49, wherein the mobile support structure is on wheels.

51. (Amended) A portable tooth whitening device as in claim 49, wherein the connection means is at least one fiber optic bundle positioned by an articulated arm capable of positioning the output at any angle from horizontal to vertical.

REMARKS

Claims 1-51, as renumbered, are pending. The application as filed contained claims numbered 1-50 but due to an inadvertent numbering error, two claims were designated as claim 32. The Examiner renumbered the second claim 32 to be claim 33 and renumbered original claims 33-50 to be claims 34-51, respectively. Throughout this response, Applicants refer to the claims as renumbered by the Examiner. Applicants thank the Examiner for correcting the error.

Claims 1-51 were rejected. The Examiner objected to the drawings. Although the Office Action refers to an Information Disclosure Statement (IDS) as papers 4 and 5, presumably initialed as acknowledged by the Examiner, Applicants did not receive a copy. Applicants respectfully request that the Examiner provide Applicants with a copy of the

acknowledged IDS by return mail. Applicants have canceled claims 2-5 without prejudice to filing a continuation or divisional application regarding these claims.

Rejections Under 35 USC § 112, Second Paragraph:

The Examiner rejected claims 31, 33, 50, and 51 under 35 U.S.C. § 112, second paragraph.

Claim 31 lacked dependency. The Examiner assumed claim 31 to depend on claim 30. Applicants have amended claim 31 to depend on claim 29. Applicants thank the Examiner for indicating the error.

Claims 50 and 51 lacked proper antecedent bases because they were drafted as dependent on claim 1. Applicants have amended claims 50 and 51 to depend on claim 49. The Examiner properly assumed that Applicants intended these claims to depend on claim 49. Applicants thank the Examiner for indicating the error.

Applicants are unaware of the Examiner's basis for rejection of claim 33, other than the necessity for renumbering beginning with claim 33. Applicants respectfully request the Examiner to state and explain the basis of his rejection of claim 33 under 35 U.S.C. § 112 second paragraph.

The amendments described herein add no new matter. Applicants respectfully submit that the amendments described moot the Examiner's rejections under 35 U.S.C. § 112, second paragraph.

Rejections Under 35 USC § 102(b) and 103(a)

The Examiner rejected claims 1, 2, 3, 10, 13, 19, 24, 25, and 29 under 35 USC § 102(b) as anticipated by Jensen et al (WO 99/37236), asserting that Jensen et al. shows a light base 32 having a curved surface and a plurality of light generating devices 40, and arguing that "[t]he output light of Jensen will inherently overlap and form a combined field." The

Examiner further argued that “[a]s to claim 2, the overlapping light will overlap in an infinite number of surfaces including a convex surface of relatively uniform intensity.”

The Examiner rejected claims 1-51 under 35 USC § 103(a), variously, under Jensen et al, Jensen et al in view of Kipke et al., Jensen et al. in view of Kipke et al. and further in view of Kennedy, Jensen et al in view of Rhoades, Jensen et al. in view of Nikodem, Jensen et al. in view of Cipolla, Nikodem in view of Cipolla, Nikodem in view of Cipolla and further in view of Fuller, Osterwalder et al., Osterwalder et al. in view of Kennedy, Rhoades, Rhoades in view of Osterwalder et al., Osterwalder et al. in view of Nikodem, and Osterwalder et al. in view of Cipolla.

Applicants traverse the Examiner’s rejections. Applicants have amended claim 1 to more clearly set forth the invention. Applicants submit that Jensen et al. does not disclose each and every element of the present invention.¹ Applicants submit that, unlike Jensen et al., the device of the present invention comprises an assembly comprising a light base with a concave surface forming an archway space, where said surface has a plurality of light generating devices on the light base wherein the combined field of light from overlapping light lobes results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the described archway space at a distance of about one-half to about 3 inches from said surface. Jensen et al. does not disclose a device having this feature and thus lacks this element of the present invention. Instead, Jensen merely discloses an arcuate directing member (32, in Figs. 1-4) that must be placed *adjacent to* the labial surface of the teeth to be illuminated (page 21 lines 1-2, Figs. 3 and 4), and is designed to fit inside a patient’s mouth (Fig. 2). Further, the devices of the present invention contain elements, lacking in Jensen et al., such as a combined field of light from overlapping light lobes results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the described archway space at a distance of about one-half to about 3 inches from said

¹ Applicants respectfully direct the Examiner to decisions of the Federal Circuit for guidance on 35 U.S.C. 102(b) anticipation: the Federal Circuit has stated that “[a]nticipation requires the disclosure in a single prior art reference of each element of the claim under consideration,” W.L. Gore & Assocs. v. Garlock, Inc., 721 F.2d 1540 (Fed. Cir. 1983) (citation omitted), and that the elements of the accused invention must be disclosed in the putative 102(b) reference “arranged as in the claim.” Lindermann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452 (Fed Cir. 1984) (citation omitted).

surface (for example, see Figs. 11-15; page 19 lines 22-28 page 20 lines 7-10; page 27 line 25 to page 28 line 7; page 33 lines 16-21). Such elements are lacking in the Jensen et al. disclosure.

Applicants submit that the device of the present invention, including a light base having a concave surface forming an archway interior space, wherein a plurality of light generating devices on the light base shine light such that a combined field of light from overlapping light lobes results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface, are nonobvious over Jensen et al. In light of the arguments above, Applicants submit that the disclosure of Jensen et al. addresses delivery of light by a device having elements that fix a light source immediately adjacent to a patient's teeth inside the mouth of the patient. Although Jensen may suggest the desirability of employing a device that shines light of a substantially uniform intensity, Jensen et al. does not disclose such a device. Applicants respectfully submit that Jensen et al. does not render obvious the present invention. Nothing in Jensen et al. discloses or suggests how to fashion a device having a concave surface forming an archway interior space that emits a combined field of light from overlapping light lobes resulting in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in an archway space at a distance of about one-half to about 3 inches from said surface. Nor is there any incentive to do so since the Jensen et al. device is intended to be used adjacent to the teeth and such intensity would thus be harmful. Instead, Jensen et al. merely discloses a device having elements that place a light source into a patient's mouth up against a patient's teeth (see, for example, light directing member of Jensen et al., labeled 32, Figs. 1-4), although Jensen et al. expressly acknowledges the desirability of a device that maintains light of a specific intensity on a specific area of the mouth (see, for example, Jensen et al. page 3 line 35 to page 4 line 2; page 4 lines 3-6), Jensen et al. does not teach how to make such a device.

Neither does Jensen et al., in combination with any of the references cited by the Examiner, render the present invention obvious. Kipke et al., cited by the Examiner in combination with Jensen et al. against claims 20-23, alone or in combination with any other

cited reference, does not disclose, suggest, or teach the present invention. Kipke et al. discloses a dental impression tray with a light source for curing photocurable impression material. Kipke et al., while recognizing the need in the art “to deliver light of increased intensity” (Kipke et al., col. 8 line 37) and the desirability of “increased luminous intensity” (col. 8 line 42), fails to disclose, suggest, or teach a device having a light base having a generally concave surface, a plurality of light generating devices positioned on said light base to shine light into said archway space, each of which is arranged to output light in a lobe that overlaps light lobes of other devices, to form a combined field of light from said plurality of light-generating devices, such that the combined field of light results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in said archway space at a distance of about one-half to about 3 inches from said surface. Instead, the device of Kipke et al. is along the lines of that in Jensen et al.; a device having elements allowing it to be placed in the mouth for irradiation immediately adjacent to the teeth. Applicants submit in light of the above that it is nonobvious to employ LEDs as employed in the present invention, in a device that comprises a light base having a concave curved surface forming an archway interior space wherein a plurality of light generating devices positioned on the light base to shine into the archway space, each of which is arranged to output light in a lobe that overlaps light lobes of other devices, to form a combined field of light from the plurality of light-generating devices, such that the combined field of light results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface. Both Jensen et al. and Kipke et al. are directed to irradiating teeth by a light-generating or light-propagating device with ***structural elements that require the device to be placed inside the human mouth***. Neither disclosures suggest or provide any specific motivation for arranging LEDS, or any other light source, in a configuration as in the present invention. Moreover, neither reference provides any disclosure suggesting the combination of elements in the present invention. Both disclosures recognize the value of the ability to regulate intensity, but fail to provide direction as to how to effectively regulate intensity employing a device with structural elements like those of the present invention.

The Examiner asserted that Jensen, in view of Kipke et al and further in view of Kennedy et al. rendered claims 27, 28, 39, 41, 47, and 48 obvious, rejecting them under 35

U.S.C. § 103(a). None of the cited references, alone or in combination with one another or in combination with any other reference cited by the Examiner, render the invention obvious. Kennedy et al. is directed to a hand-held light emitting device employing light-generating LEDs in an optical assembly coupled to output fiber optic elements for collimation and focusing of the light (see, for example, Kennedy et al. col. 4 lines 24-29, and elements 18, 38, and 36 of Fig. 1 therein), and a fan may be included to cool the LEDs. The fan of Kennedy et al. blows air onto the LEDs and a heat sink/substrate, *in the same direction* the light is traveling (Kennedy et al. Fig. 1 and col. 4 lines 11-17). The present invention draws air through passages in the light base so that the air travels *in the opposite direction* the light is traveling, thus assuring that air is not blown into the face of the patient during treatment. This element is lacking in Kennedy et al., and no combination of this reference with Jensen et al. or Kipke et al. suggests or provides any motivation for this embodiment of the present invention. Kennedy et al., alone or in combination with any other reference cited, does not render the present invention obvious. Like certain of the other references cited, Kennedy et al. recognizes the desirability for an improvement in regulating light intensity: "it may be desirable to increase the intensity level instead of the exposure time in order to provide an [sic] light energy output which is optimum for the curing application" (col. 1 lines 56-59). However, Kennedy et al. does not disclose, suggest, or provide any guidance as to a device having a concave surface forming an archway interior space, wherein a plurality of light generating devices on the light base shine light such that a combined field of light from overlapping light lobes results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface. Indeed, Kennedy et al. discloses nothing related to devices for generating light output of substantially uniform intensity over a fixed defined area. With regard to the embodiment of the invention in claim 48, neither of the cited references, alone or in combination, disclose, teach, or suggest a portable tooth whitening device comprising one or more light source, at least one optical output, a projection means for holding and positioning the optical output outside of a patient's mouth in a manner which provides approximately simultaneous and uniform illumination of a patient's front teeth by the optical output, and connection means for connecting the light source to the optical output, and a mobile support structure on which the light is attached. Indeed, none of the references cited,

for example, describe a projection means element as does one embodiment of the invention in claim 48 (see application, page 25 line 26 to page 26 line 11).

Applicants submit that Rhoades, either alone or in combination with any other reference cited, does not render the present invention obvious. Rhoades discloses combination jaw rests and ejector devices for removing material from an oral cavity, and combinations thereof that include an illumination source. Nowhere in Rhoades is there any suggestion of a device having a concave surface forming an archway interior space, wherein a plurality of light generating devices on the light base shine light such that a combined field of light from overlapping light lobes results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface. In contrast, Rhoades discloses a jaw rest as a housing for a suction device and a light bulb to be placed in a patient's mouth (see, for example, col. 5 lines 11-20). Applicants submit that a device such as that disclosed in Rhoades, either alone or in combination with Jensen et al. or any other cite reference, cannot render the present invention obvious. Neither Rhoades nor any of the other cited references disclose or suggest a combination of elements in the present invention. Notably, Rhoades does not concern itself with light intensity, nor does it address portable tooth whitening devices, nor positioning means for positioning light to provide approximately simultaneous and uniform illumination of a patient's teeth. Rhoades does not suggest employing an assembly with a light base having a concave surface forming an archway interior space, wherein a plurality of light generating devices on the light base shine light such that a combined field of light from overlapping light lobes results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface.

Applicants submit that Nikodem, either with Jensen et al., alone, or in combination with any other reference cited, does not render the present invention obvious. Nikodem merely discloses a housing deformable to conform to an arch shape of a patient's teeth (Nikodem, col. 2 lines 41-43), that may also allow for light input. Nowhere in Nikodem is there any suggestion that the bite block therein disclosed may be employed to position a device that comprises a light base having a concave curved surface forming an archway

interior space wherein a plurality of light generating devices positioned on the light base to shine into the archway space, each of which is arranged to output light in a lobe that overlaps light lobes of other devices, to form a combined field of light from the plurality of light-generating devices, such that the combined field of light results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface. Indeed, as in the other references cited by the Examiner, Nikodem does not disclose or suggest the combination of elements of the present invention.

Applicants submit that Cipolla does not render the present invention obvious, either alone, in combination with Jensen et al, or in combination with any of the references cited by the Examiner. Combining the disclosure of Jensen et al. with the filter of Cipolla does not suggest or motivate the invention of a device that comprises a light base having a concave curved surface forming an archway interior space wherein a plurality of light generating devices positioned on the light base to shine into the archway space, each of which is arranged to output light in a lobe that overlaps light lobes of other devices, to form a combined field of light from the plurality of light-generating devices, such that the combined field of light results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface. Nor does such a combination suggest a portable tooth whitening device comprising one or more light sources, at least one optical output, a projection means for holding and positioning the optical output outside of a patient's mouth in a manner which provides approximately simultaneous and uniform illumination of a patient's teeth, a connection means for connecting the light source to the optical output, and a mobile support structure on which the light is attached. Each of the above-mentioned embodiments of the invention comprise elements and combinations of elements not disclosed in either Cipolla or in Jensen et al., or any of the other references cited. To the extent that the cited references disclose elements such as filters, flexible bases, or projections means, these disclosures do not render the present invention obvious because the cited references are bereft of any suggestion to combine such elements in the manner of the present invention, and add others, to arrive at the present invention.

Applicants respectfully submit that neither Nikodem nor Cipolla, viewed separately, together, or with Jensen et al., do not anticipate or render the portable tooth whitening device of the present invention (see claim 49) obvious. The portable tooth whitening device of the present invention comprises one or more light sources, at least one optical output, a projection means for holding and positioning the optical output outside of a patient's mouth in a manner which provides approximately simultaneous and uniform illumination of a patient's front teeth by the optical output, a connection means for connecting the light source to the optical output, and a mobile support structure on which the light is attached. The cited references do not disclose the projection means (see application, claim 49) of the portable tooth whitening device of the present invention, nor do they suggest the employment of such a projection means. The Examiner is invited to compare, for example, the present application page 25 line 22 to page 26 line 5 describing the positioning means, with the absence of such an element in the entire disclosures of Cipolla and Nikodem.

Applicants submit that Nikodem, Cipolla, Fuller et al., or Jensen et al., alone or in combination, do not render the present invention unpatentable. As set forth above, Jensen et al., Nikodem, and Cipolla lack elements of the present invention and provide no suggestion to combine their disclosed elements with the novel elements of the present invention. Fuller et al., directed to a lamp, provides an articulated arm, wheels, and only one element to influence the intensity of light emitted from the lamp—a "knob" (Fuller et al., col. 3 lines 17-18). Applicants submit that Fuller et al., alone or in combination with any of the cited references, cannot reasonably be construed to even suggest a portable tooth whitening device of the present invention comprises one or more light sources, at least one optical output, a projection means for holding and positioning the optical output outside of a patient's mouth in a manner which provides approximately simultaneous and uniform illumination of a patient's front teeth by the optical output, a connection means for connecting the light source to the optical output, and a mobile support structure on which the light is attached. Nor can Fuller et al. be reasonably considered, alone or in combination with the other cited references, to suggest a device that comprises a light base having a concave curved surface forming an archway interior space wherein a plurality of light generating devices positioned on the light base to shine into the archway space, each of which is arranged to output light in a lobe that overlaps light lobes of other devices, to form a combined field of light from the plurality of light-

generating devices, such that the combined field of light results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface.

Applicants submit that claims 1, 38, and 43 are not unpatentable in view of Osterwalder et al., taken alone or in combination with any other cited reference. Osterwalder is directed to a self contained light source having a plurality of closely spaced light emitters to direct light to a common focal point. The Osterwalder device employs LEDs, but the LEDs in that device are oriented to focus at the same *point* in the device (see, for example, Osterwalder et al., col. 2 lines 12-13, lines 24-26, 44-46; see also claims 1, 10, 14, and 19), and employs a reflecting device to reflect from the focal point out the side of the device (Osterwalder et al., col. 2 lines 46-47). The Osterwalder device also has a very small diameter distal end for use in a patient's mouth (Osterwalder et al., col. 2 lines 56-57). Nowhere in Osterwalder can be found any disclosure or suggestion of a device that comprises a light base having a concave curved surface forming an archway interior space wherein a plurality of light generating devices positioned on the light base to shine into the archway space, each of which is arranged to output light in a lobe that overlaps light lobes of other devices, to form a combined field of light from the plurality of light-generating devices, such that the combined field of light results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface. Indeed, the Osterwalder et al. disclosure is concerned with *maximizing* light intensity (see, for example, Osterwalder col. 4 lines 1-9, 18-23), with the above-mentioned elements employed in a configuration to achieve that goal. In contrast, the present invention contains elements and combinations of elements neither disclosed nor suggested in Osterwalder et al., including a plurality of light generating devices thereon arranged to form a combined field of light resulting in output of about 10 to about 300 milliWatt/cm² in the archway space at a distance of about one-half to about 3 inches from said surface. None of the references cited by the Examiner suggest combining their elements with those of Osterwalder et al., and/or incorporating new elements or new arrangements of elements to arrive at the present invention.

Applicants submit that dependent claims 2-37, 39-42, 44-48, and 50-51 are not

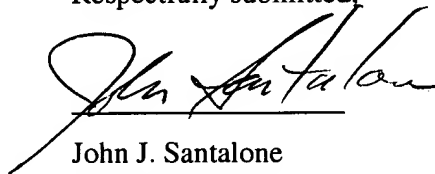
Applicants: Cipolla et al.
Filing Date: August 18, 2000
Serial No.: 09/641,646
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unpatentable for the reasons stated above. Further, because the claims they depend on, claims 1, 38, 43, and 49, are neither anticipated nor obvious in light of the prior art cited, the dependent claims are not unpatentable. Applicants hereby traverse each and every rejection asserted by the Examiner, to the extent not specifically addressed herein. All rejections having been traversed or mooted, Applicants respectfully request reconsideration of the Examiner's rejections in light of the above.

Conclusion

In light of Applicants's amendments and remarks, Applicants respectfully submit that this application is in condition for further examination or allowance. If there are any questions relating to the present application, the Examiner is respectfully invited to contact Applicants's attorney at the telephone number below. No fee other than the fee for the three-month extension of time is believed to be necessary. If any additional fee is required, or overpayment has been made, please charge, or credit, our Deposit Account No. 11-0171 for such sum.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "John J. Santalone", is written over a horizontal line.

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Cipolla et al. Examiner: Wilson, J.
Filing Date: August 18, 2000 Group Art Unit: 3732
Serial No: 09/641,646 Docket: 13072
For: Apparatus for Simultaneous Illumination of Teeth

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15

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February 15, 2002

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MARKUP OF AMENDMENTS IN ACCORDANCE WITH 37 CFR 1.121

IN THE SPECIFICATION:


Please amend the specification in the manner indicated:

**Please delete the paragraph spanning line 4 through line 15 on page 36 of the
application and replace it with the following paragraph:**

The pellicle staining broth was prepared by adding 1.02 grams of instant coffee, 1.02 grams of instant tea, and 0.75 grams of gastric mucin (Nutritional Biochemicals Corp., Cleveland OH 44128) to 250 ml of sterilized trypticase soy broth. Approximately 50 ml of a 24-hour *Micrococcus luteus* culture was also added to the stain broth. The apparatus, with the enamel specimens attached and the staining broth in the trough was then placed in an incubator at [370 C.] thirty-seven degrees Centigrade with the specimens rotating continuously through the staining broth and air. The staining broth was replaced once every

24 hours for ten consecutive days. With each broth change the trough and specimens were rinsed and brushed with deionized water to remove any loose deposits. On the eleventh day the staining broth as modified by the addition of 0.03 grams of $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$, and this was continued with daily broth changes until the stained pellicle film on the specimens was sufficiently dark. Then the specimens were removed from the staining broth, brushed thoroughly with deionized water, and refrigerated in a humidior until used.

Please delete the paragraph spanning line 6 to line 20 on page 19 of the application and replace it with the following paragraph:

 The front surfaces of the device are positioned to give an output configuration such that the combined beams from each optical output converge to illuminate at least the eight central teeth in both the upper and lower arches or the area from the incisors to the first premolars in each half arch, a total area of about 10.4 cm^2 in the average male. Although depicted in Figure 1 as linear in form, these outputs may be of any shape, e.g., circular, triangular or linear. Linear forms are preferred. The preferred embodiments have six linear outputs, each output having a length to width ratio of about $16 \pm 20 \%$ -- i.e., ratios of 12.8 to 19.2. In the most preferred embodiment, 80% of the light projected from the outputs onto the 8 upper and lower central teeth is within an area between about 0.9 and about 1.5 inches wide, the approximate distance from the top of the enamel of the top teeth to the bottom of the enamel of the bottom teeth. Each optical output preferably is connected to a distal light source by two glass or plastic fiber optic bundles which originate at the distal light source, enter the device through a socket 20 and terminate at the trifurcated linear output window. Non-uniformity in fiber transmission is generally observed to be minor in the absence of [actually] actual breaks in the fibers. Variation in optical output from point to point at the surface of each output or emitter should be no more than about $\pm 10\%$.

IN THE CLAIMS:

Please cancel claims 2, 3, 4, and 5.

Please amend the following claims in the manner indicated:

1. (Amended) An assembly comprising:

a [light-base] light base having a concave curved surface forming an archway interior space; and

a plurality of light-generating devices positioned on said light base to shine light into said archway space, each of which is arranged to output light in a lobe that overlaps light lobes of other devices, to form a combined [filed] field of light [with the other ones of] from said plurality of light-generating devices, such that the combined field of light results in light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² in said archway space at a distance of about one-half to about 3 inches from said concave curved surface.

6. (Amended) The assembly of claim [5] 1 where said [relatively] substantially uniform light intensity is achieved through directing of said lobes by means of any one or more of the following: individual lenses integrally associated with said light-generating devices; individual lenses positioned in proximity of said light-generating devices; a light-transmitting membrane that includes lenses, positioned in front of said light-generating devices; perturbations in said curved surface that cause said light generating means to be angled; precisely forming said curved surface, interposing pedestals between said light-generating means and said concave curved surface.

8. (Amended) The assembly of claim [5] 1 where said [relatively] substantially uniform light intensity is achieved through digital or analog control of electrical energy that powers each of said light-generating devices.

9. (Amended) The assembly of claim [5] 1 where said [relatively] substantially uniform light intensity is achieved through use of light-generating devices of different sizes.

16. (Amended) The assembly of claim 14 where [different ones of] said light-generating devices and their associated lenses direct their lobes at [different] differing angles with [respect] regard to their respective positions on said [light-base] light base.

19. (Amended) The assembly of claim 1 where said plurality of light-generating devices [form] are positioned on said light base in a uniform spatial pattern.

20. (Amended) The assembly of claim 1 where said [light sources] light-generating devices are light emitting diodes that are affixed on said light base.

21. (Amended) The assembly of claim 1 where said [light sources] light-generating devices are light emitting diodes that are manufactured on a surface that is coupled to said [light-base] light base.

22. (Amended) The assembly of claim 1 where said light-generating devices are light emitting diodes that are grown on a surface that is coupled to said [light-base] light base.

23. (Amended) The assembly of claim 1 where said light-generating devices are light emitting diodes that are grown on said [light-base] light base.

27. (Amended) The assembly of claim 20 further comprising passages in said [light-base] light base that allow air to flow through said passages.

28. (Amended) The assembly of claim 27 further comprising means for drawing air through said passages in a direction opposite to the direction of light output of said light emitting diodes.

29. (Amended) The assembly of claim 1 further comprising positioning means coupled to said [light-base] light base for placing said assembly so that said concave curved surface is at a preselected position relative to the teeth of a patient.

31. (Amended) The assembly of claim 29 where said positioning means is a bite block.
34. (Amended) The assembly of claim [31] 33 where said pair of light sources are positioned and directed to form two light beams that meet at a point that is at a predetermined distance from said concave curved surface.
35. (Amended) The assembly of claim 1 where said [light-base] light base is constructed of a material that is flexible, to allow changing curvature of said curved surface.
36. (Amended) The assembly of claim 1 further comprising a light blocking attachment coupled to said [light-base] light base.
37. (Amended) The assembly of claim [35] 36 where said light blocking attachment is adapted to block light in the wavelength range of said light sources.
38. (Amended) An assembly for placing in front of a patient's teeth when used in connection with whitening teeth comprising:
- a [light-base] light base having a generally concave curved surface; and,
- a plurality of light-generating devices positioned on said surface, each of which is arranged to output light in a lobe [that is directed to additively contribute to a field of light with the other ones of said plurality of light-generating devices, which field of light is at surface of said teeth] such that light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² is generated at a distance of about one-half to about three inches from said concave surface.
39. (Amended) The assembly of claim [37] 38 where said light-generating devices produce a blue light.
40. (Amended) The assembly of claim [37] 38 where said light is approximately centered

at 475 nm.

41. (Amended) The assembly of claim [37] 38 where said light-generating devices are LEDs that product a blue light.

42. (Amended) The assembly of claim [37] 38 where said lobes of said light-generating device overlap at said teeth.

43. (Amended) An assembly comprising:

a [light-base] light base; and,

a plurality of light-generating devices positioned on said light base, each of which is arranged to generate a lobe of light, [and the light-generating devices are arranged to have their respective lobes of light overlap at a predetermined distance from said light base, at which distance the light form said light-generating devices is in the range of 10 and 300 mw/cm²] said lobes combining such that light output of substantially uniform intensity of about 10 to about 300 milliWatt/cm² is generated on a surface at a distance of about one-half to about three inches from said light-generating devices.

44. (Amended) The assembly of claim [42] 43 where said lobes of light overlap to form a field of light that is approximately the size of one tooth.

45. (Amended) The assembly of claim [42] 43 where said lobes of light overlap to form a field of light that uniformly covers a number of teeth.

46. (Amended) The assembly of claim [42] 43 where said lobes of light overlap to form a field of light that uniformly and concurrently covers upper eight and lower eight teeth of a patient.

47. (Amended) The assembly of claim [42] 43 where said light-generating devices

generate light in the blue range.

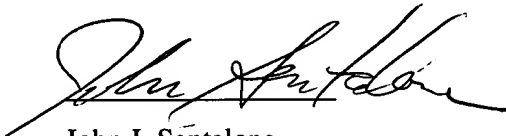
48. (Amended) The assembly of claim [42] 43 where said light-generating devices are LEDs that generate light in the spectral range 300-900 nm.

49. (Amended) A portable tooth whitening device comprising:
one or more light [source] sources;
at least one optical output;
projection means for holding and positioning the optical output outside of a patient's mouth in a manner which provides approximately simultaneous and uniform illumination of a patient's [from] front teeth by the optical output;
connection means for connecting the light source to the optical output; and
a mobile support structure on which the light is attached.

50. (Amended) A portable tooth whitening device as in claim [1] 49, wherein the mobile support structure is on wheels.

51. (Amended) A portable tooth whitening device as in claim [1] 49, wherein the connection means is at least one fiber optic bundle positioned by an articulated arm capable of positioning the output at any angle from horizontal to vertical.

Respectfully submitted,



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